DOCUMENT RESUME

ED 165 696 HE 010 997

AUTHOR	Chan, James L.; Snyder, Gerald E.
TITLE	Evaluating the Economic Viability of Universities by Using Price-Level-Adjusted Financial Data. Faculty Working Papers.
INSTITUTION	Arizona State Univ., Tempe. Coll. of Business Administration.
REPORT NO	AC-79-8
PUB DATE	79
NOTE	28p.; Reproduced from best copy available
EDRS PRICE	MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS	Cost Indexes; *Economic Change; Economic Progress; *Educational Economics; Educational Finance; Higher Education; Inflation (Economics); Models; Predictor Variables; Resource Allocations; *School Accounting; *School Statistics; State Universities; Statistical Analysis; *University Administration
IDENTIFIERS	Arizona State University; *Full Time Equivalent Students; Higher Education Price Index; Northern Arizona University; University of Arizona

ABSTRACT

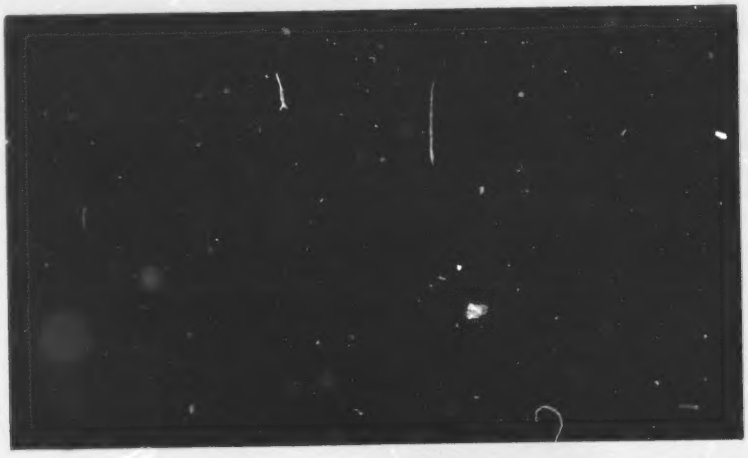
Ways in which the external financial disclosures by universities may evaluate institutional economic viability are demonstrated. It is argued that the evaluation should take into account the effect of inflation and activity level. The evaluation model requires several years' information about revenues (general operating fund), the impact of inflation (as measured by the Higher Education Price Index (HEPI], and student enrollment in full-time equivalent (SFTE). Currently financial disclosure requirements of universities call for reporting only the revenue figures for individual years, and none of the other necessary information. Economic viability is measured by several growth indicators: revenue (R), R as adjusted by the HEPI (PLAR), R/SFTE, and PLAR/SFTE. Based on the data for the three state universities in Arizona for 1971-1978, this paper concludes that: (1) PLAR and PLAR/SFTE measure more accurately the economic viability of the universities in an inflationary environment; (2) university financial reports should include multi-year financial statistics and applicable price level changes; (3) instead of student headcount, universities should show SFTE; and (4) with appropriate supplementary information and analytic procedure, fund accounting information can be made more useful. (Author/MSE)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED165696

BEST COPY AVAILABLE

Faculty Working Papers



BUREAU OF BUSINESS AND ECONOMIC RESEARCH

COLLEGE OF BUSINESS ADMINISTRATION

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

U.S. DEPARTMENT OF HEALTH EDUCATION & WELFARE NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.

ARIZONA STATE UNIVERSITY

TEMPE, ARIZONA

2

HE 010 997

EVALUATING THE ECONOMIC VIABILITY OF UNIVERSITIES BY USING PRICE-LEVEL-ADJUSTED FINANCIAL DATA

James L. Chan
Gerald E. Snyder
Arizona State University

DEPARTMENT OF ACCOUNTING AC 79-8

BEST COPY AVAILABLE

This is a working paper and may not be quoted or reproduced in whole or in part without the written consent of the author. Comments or suggestions regarding it should be sent to the author.

EVALUATING THE ECONOMIC VIABILITY OF UNIVERSITIES BY USING PRICE-LEVEL-ADJUSTED FINANCIAL DATA

ABSTRACT

The purpose of this paper is to demonstrate how the external financial disclosures by universities may be used to evaluate their economic viability, and to argue that the evaluation should take into account the effect of inflation and activity level. The evaluation model requires multiyears' information about revenues (General Operating Fund), the impact of inflation (as measured by the Higher Education Price Index, HEPI), and student enrollment in full-time equivalent (SFTE). Currently financial disclosure requirements of universities call for reporting only the revenue figures for individual years, and none of the other necessary information. Economic viability is measured by several growth indicators: revenue (R), R as adjusted by the HEPI (PLAR), R/SFTE, and PLAR/SFTE. Based on the data for the three state universities in Arizona for 1971-1978, this paper concludes that: 1) PLAR and PLAR/SFTE measure more accurately the economic viability of the universities in an inflationary environment. 2) University financial reports should include multi-year financial statistics and applicable price level changes. 3) Instead of student headcount, universities should show SFTE, which is a better predictor of resource requirements. 4) With appropriate supplementary information and analytic procedure, fund accounting information can be made more useful.

KEY WORDS: University, Economic Viability, Price-Level-Adjusted Revenue (PLAR), PLAR/(Student FTE), Higher Education Price Index, Fiscal Years 1971-1978, Arizona Public Universities University External Disclosures.

Discussions about general price-level adjustments of financial statements have primarily focused on those of busines firms. Such adjustments call for the separation of monetary and non-monetary assets and liabilities, and the measurement an disclosure of purchasing power gains and losses on net monetary position. Even though the APB and the FASB have both considere the issue, price-level-adjustements are not currently required for commercial or non-profit enterprises. However, the impact of rather significant inflation cannot be ignored. Certainly institutions of higher education have not been immune from inflationary pressure. Inflation erodes the purchasing power of their revenue dollars and consequently their economic viabi This has to be recognized by using a procedure widely used by economists to convert current dollars to dollars of comparable purchasing power.

The first section of the paper states the arguments for recognizing the impact of inflation on universities, and preser a simple resource flow model of a university. The objective of this section is to come to a better understanding of the concep of economic viability in an inflationary environment. The secc section introduces the Higher Education Price Index (HEPI), whi will be used to adjust the fund accounting data selected by the resource flow model. The third section illustrates how the HEPI and the student enrollment data are used to improve financ data of the three Arizona state universities so that users can better evaluate these institutions' economic viability. The concluding section points out the implications of the present analysis for both external disclosure of universities and

internal management use.

ARUGMENTS FOR PRICE-LEVEL ADJUSTMENTS

Inflationary Impacts on Higher Education

Colleges and universities in the United States are required by policy-making bodies (NACUBO, 1974; AICPA, 1975) to use fund accounting. Since fund accounting is based on historical costs, it fails to reflect the changes in general or specific price level changes. When inflation is significant the prescription that "[a]ccounting reports should be based on a stable measuring unit" [Moonitz, 1961, p. 50] is violated. The Accounting Principles Board (APB), while conceding in its Statement No. 3 that "general price-level adjusted financial statements present useful information that is not available from historical statements," believed nevertheless that the general price-level adjustment information was not required for fair presentation of financial position and results of operations [APB, 1969, p. 12]. The FASB has also concluded that the costs exceed the benefits to warrant requiring price-level adjustments NACUBO and the AICPA College and University Audit Guide are silent on the matter, which in effect means that price-level adjustments are not required of colleges and universities. This further weakens the usefulness of fund accounting data, which has already been accused of not being useful for evaluating the results or process of financial operations of colleges and universities [Schipper, 1977, p. 3]. At this time, there are major efforts being made to erect a sound conceptual framework

for non-profit accounting [Anthony, 1978; FASB Discussion Memorandum, June 15, 1978]. However, the effects of inflation are not explicitly addressed. In this paper, we are taking the attitude that, before new and hopefully better information becomes available, a short-term constructive approach is to maximize the utility of available information. In particular, we are concerned about using universities' external disclosures to evaluate their economic viability.

The effects of inflation on universities are a major concern of the higher education community. In the words of Cyert, the President of Carnegie-Mellon:

> "The inflation factor means that the organization must continue to get in its total revenues equal to the rate of inflation if it is to achieve a constant dollar equilibrium." (Cyert, 1978, p. 346).

From the accounting point of view, a major research and implementation question is how to measure economic viability (or distress). In the simplest possible terms, an institution is in distress when it fails to break even. Thus definitionally a university improves its economic viability by increasing revenues and/or decreasing expenditures. Since most public institutions are not facing the prospect of closing doors, in this study we do not use Schipper's definition of financial distress as being "the imminent cessation of existence as an independent entity or a decision to so cease" (Schipper, 1977, p. 2). Such dire consequences are not faced by most public

institutions of higher education. For wider applicability, it appears more useful to regard financial distress as a continuous variable (degrees of financial distress), rather than as a dichotomous variable (stress or no stress). Since inflation reduces the purchasing power of a university's revenue dollars, it aggravates financial distress and has to be explicitly recognized in analyzing a university financial situation. The magnitude of inflation in higher education is revealed by the annually updated Higher Education Price Index (HEPI), as shown in Table 1.

- - - - - - - - - - - - - - - -

Insert Table 1 here

- - - - - - - - - - - - - - - -

To come to a better understanding on the financial viability of a university, the next section presents a simplified resource flow model.

A University Resource Flow Model

A fundamental driving force behind a university is students demand for educational services. The demand gives rise to the need for the acquisition and utilization of productive resources. Since the factors of production have to be paid for in an exchange economy, the public university needs financial resources contributed directly by the students themselves or indirectly by the state legislature on behalf of taxpayers. Figure 1 shows the relationships among these variables. The arrows indicate the direction of influence. A $\xrightarrow{+}$ B means more of A induces more of B. C $\xrightarrow{-}$ D means more of C induces less of D. The

relationship between the university's budget requests and the amount of subsequent state appropriation is not clear *a priori*.

- - - - - - - - - - - - - - -
Insert Figure 1 here
- - - - - - - - - - - - - - -

Since university external financial disclosures are based on historical costs, the only variables in the model reflected in financial statements are state appropriations and student tuition (which are a public university's major sources of revenue), and expenditures. Since universities are not allowed to accumulate surpluses or deficits in the long-run, their Current Operating Fund revenues and expenditures tend to equalize. In addition to the absolute amount of revenues (R) one should also be concerned with student enrollment, which is a surrogate of demand for services. In the model, student full-time-equivalent (SFTE) is used, instead of student headcount, because it represents better the resource requirements. If the R/SFTE ratio goes down, *other things being equal*, the university is likely to be experiencing financial distress.

One of the things that may not be equal is the purchasing power of the revenue dollar over time. To ascertain the growth (positive or negative) of revenues in real terms for the aggregate or per capita, it is necessary to convert the R, and R/SFTE in dollars of comparable purchasing power. The results are price-level-adjusted revenue (PLAR) and PLAR/SFTE, respectively. The growth patterns of PLAR and PLAR/SFTE give a more accurate picture of the resource availability of the

university. The next section explains the HEPI and the conversion procedure.

THE HIGHER EDUCATION PRICE INDEX

The Higher Education Price Index (HEPI) "measures average changes in prices of goods and services purchased by colleges and universities through current fund educational and general expenditures. ...Sponsored research and auxiliary enterprises are not priced by the HEPI." It is based on the prices of the various goods and services (e.g. personnel compensation, contracted services, supplies and equipment) purchased by colleges and universities in 1971-72 (Halstead, 1978, p. 4). Overall composition of the HEPI is as follows (pp. 5-6):

Professional salaries	$ 58.0%
Non-professional wages and salaries	15.0
Fringe Benefits	9.0
Contracted services	7.3
Supplies and materials	3.5
Equipment	2.5
Books and periodicals	1.7
Utilities	3.0
	100.0%

The HEPI is prepared and updated annually by the National Institute of Education, U. S. Department of Health, Education and Welfare. It is based upon salary surveys conducted by various national higher education associations, the Bureau of Labor Statistics, and the National Center for Educational Statistics; and from components of the Consumer Price Index (CPI) and the Wholesale Price Index (WPI) published by the

U. S. Department of Labor, Bureau of Labor Statistics." (Halstead, 1978, p. 4). The price index uses Fiscal Year 1971 as the base year and the latest supplement covers Fiscal Year 1978.

The HEPI consists of an overall price index for all institutions of higher education, and separate price indices for various categories of institutions. These categories distinguish universities according to the type of control (public versus private), and the type and number of degrees awarded. For example, Category I includes universities offering the doctoral degree and having conferred in the most recent 3 years an annual average of 15 or more earned doctorates in at least 3 nonrelated fields. Category IIA includes universities awarding post baccalaureate but not included in Category I. (Halstead, 1978, Table A-1). Based on information available in their annual reports, University of Arizona and Arizona State University fall into Category I, and Northern Arizona University in Category IIA.

ECONOMIC VIABILITY INDICATORS FOR THE PUBLIC UNIVERSITIES IN ARIZONA

There are several indicators of the economic viability of public universities. In terms of preferability, the rank ordering would be: PLAR/SFTE, PLAR, R/SFTE, R. Table 2 shows the R, PLAR of the three public universities in the State of Arizona for the Fiscal Year 1971 to 1978, and the annual percentage changes. It is readily observed that the revenue growth

rates in adjusted terms is smaller than those in current dollar terms. It is up to the reader to judge how significant the inflationary impact has been.

- - - - - - - - - - - - - - -
Insert Table 2 here
- - - - - - - - - - - - - - -

The R and PLAR give an incomplete picture in that if the demand for services financed by the revenue dollars goes up at a faster rate, the universities are no better off. Indeed, the public university system of the State of Arizona experienced steady growth during the period 1971 to 1978. The three universities, however, have their own patterns of fluctuation as can be seen from Table 3. Thus a more refined analysis is to relate R and PLAR to SFTE (Table 4). The result of this analysis shows that in several instances the universities actually experienced negative growth. The impact of fluctuating enrollment levels on the per capita PLAR is summarized in Table 5, which compares the growth rates of PLAR and PLAR/SFTE during the period 1971 to 1978. Due to the lags in the budgetary process and difficulties of projecting student enrollments, one does not observe equal PLAR and PLAR/SFTE growth rates for the same year, as can also be seen in Figure 2.

- - - - - - - - - - - - - - -
Insert Tables 3,4,5 here
- - - - - - - - - - - - - - -

- - - - - - - - - - - - - - -
Insert Figure 2 here
- - - - - - - - - - - - - - -

Several considerations should be kept in mind while interpreting the data:

1) R = state appropriations + student tuition in the Current Operation Fund. The other types of revenues, which are relatively minor, are excluded in the analysis. This definition was chosen to take advantage of the HEPI, which specifically excludes auxiliary enterprises and sponsored research.

2) The SFTE is for the fall semester of a particular academic year, which is taken to be representative of the whole academic year. Thus PLAR/SFTE for the FY78 would be PLAR for FY 1978 divided by SFTE in the Fall of 1977. The data was obtained from the State of Arizona Board of Regents, since the universities' financial reports disclose only head-count enrollment data.

CONCLUSIONS AND POLICY IMPLICATIONS

An objective of college and university accounting is to enable users to evaluate the financial viability of the university. Our evaluation model calls for the measurement and communication of the growth pattern of the revenues available to the university to undertake educational programs. More specifically, we argued that in an inflationary environment, one should recognize the erosion of the purchasing power of the revenue dollars. Based on magnitude of inflation in the higher education sector, we conclude that both revenues and revenues per student full-time equivalent should be adjusted by using the most applicable price level index, the Higher Education Price Index. The procedure we have suggested is

rather efficient, because the HEPI is available annually at a minimal cost. However, to implement the whole analysis, the student enrollment FTEs are also needed. These two types of information are not typically disclosed in the financial statements of colleges and universities, but can be disclosed at minimal incremental cost.

Skousen et. al. (1975, p. 42) pointed out in their empirical study of the users' needs for college and university financial information:

> Many users involved in the appropriation decision also expressed great concern about the need to measure the impact of inflation upon the institution. They felt if the same objectives continued to be sought by the institution, the amounts appropriated must be adjusted to account for the change in the value of the dollar.

We have demonstrated the feasibility of making the adjustments called for by these users. We would recommend that colleges and universities disclose the PLAR/SFTE and PLAR, as illustrated in this paper, in a supplementary schedule. As an alternative, they could communicate the HEPI applicable to them, and SFTE (in addition to, or in lieu of headcount), so that users can use the information to make a meaningful evaluation of the economic viability of the institutions.

REFERENCES

Accounting Principles Board, Statement #3 "Financial Statements Restated for Price-Level Changes," (AICPA, 1969).

American Institute of CPAs, Audits of Colleges and Universities (AICPA, 1975).

Anthony, R. N., Financial Accounting in Nonbusiness Organizations (FASB, 1978).

Arizona State University, Financial Reports, for the Fiscal Years 1971 to 1978.

Cyert, R M., "The Management of Universities of Constant or Decreasing Size," Public Administration Review (July/August 1978), pp. 344-349.

Financial Accounting Standards Board, An Analysis of Issues Related to Conceptual Framework for Financial Accounting and Reporting: Objectives of Financial Reporting by Non-business Organizations Discussion Memorandum (FASB, 1978).

Halstead, D. K., Higher Education Prices Indexes, 1978 Supplement (U. S. DHEW, 1978).

Moonitz, M., The Basic Postulates of Accounting (AICPA, 1961).

National Association of College and University Business Officers (NACUBO), Administrative Service, Part 5: Financial Accounting and Reporting (NACUBO, 1974).

Northern Arizona University, Annual Reports, for the Fiscal Years 1971-1978.

Schipper, K., "Financial Distress in Private Colleges." Journal of Accounting Research, Supplement 1977 (pp. 1-40).

Skousen, K. F., et. al., User Needs: An Empirical Study of College and University Financial Reporting (NACUBO, 1975).

State of Arizona, Board of Regents. "Enrollments Headcount and Full Time Equivalent" (Xerox Copy, 1978).

University of Arizona, Financial Reports, for the Fiscal Years 1971-1978.

TABLE 1

HIGHER EDUCATION PRICE INDICES

Fiscal Year	All Institutions		Category I		Category II A	
	Index	% Chg	Index	% Chg	Index	% Chg
1971	100.0		100.0		100.0	
1972	105.6	5.6	106.0	6.0	105.6	5.6
1973	111.2	5.3	110.7	4.4	111.8	5.9
1974	119.1	7.1	118.8	7.3	120.8	8.1
1975	129.1	8.5	128.6	8.2	132.1	9.4
1976	137.8	6.7	137.6	7.0	140.4	6.3
1977	146.7	6.5	146.5	6.5	149.4	6.4
1978	156.5	6.7	156.6	6.9	159.7	6.9

Source: Halstead, 1978, p. 35

TABLE 2
R AND PLAR FOR
THE PUBLIC UNIVERSITIES IN ARIZONA
FY 1971-78
(In Millions)

FY	Arizona State University				University of Arizona				Northern Ariz. University				Aggregate			
	R		PLAR		R		PLAR		R		PLAR		R		PLAR	
	$	%Chg	$	%Chg	$	%Chg	$	%Chg	$	%Chg	$	%Chg	$	%Chg	$	%Chg
71	33.4		33.4		40.3		40.3		11.5		11.5		85.2		85.2	
72	36.7	9.9	34.6	3.6	44.6	10.7	42.1	4.5	12.8	11.3	12.1	5.2	94.1	10.4	88.8	4.2
73	40.3	9.8	36.4	5.2	49.3	10.5	44.5	5.7	14.1	10.2	12.6	4.1	103.7	10.2	93.5	5.3
74	47.7	18.4	40.2	10.4	56.7	15.0	47.7	7.2	16.3	15.6	13.5	7.1	120.7	16.4	101.4	8.4
75	53.9	13.0	41.9	4.2	63.8	12.5	49.6	4.0	17.8	9.2	13.5	0.0	135.5	12.3	105.0	3.6
76	59.5	10.4	43.2	3.1	68.8	7.8	50.0	.8	18.7	5.1	13.3	-1.5	147.0	8.5	106.5	1.4
77	67.7	13.8	46.2	6.9	76.8	11.6	52.4	4.8	21.5	15.0	14.4	8.3	166.0	12.9	113.0	6.1
78	76.0	12.3	48.5	5.0	89.6	16.7	57.2	9.2	24.6	14.4	15.4	6.9	190.1	14.6	121.1	7.2

TABLE 3

SITE FOR THE

PUBLIC UNIVERSITIES IN ARIZONA

FY 1971-78

Fall of Academic Year	University of Arizona (Main Campus)	Arizona State University	Northern Arizona University	Total
1970-71	23,238	23,022	7,804	54,064
1971-72	23,895	23,377	8,234	55,506
1972-73	23,480	23,571	7,975	55,026
1973-74	24,201	24,390	8,048	56,639
1974-75	23,388	25,996	8,367	57,751
1975-76	25,049	28,184	9,174	62,407
1976-77	24,584	27,607	9,417	61,608
1977-78	24,503	28,322	10,022	62,847

Source: State of Arizona Board of Regents Office.

14

TABLE 4
R/SFTE AND PLAR/SFTE FOR
THE PUBLIC UNIVERSITIES IN ARIZONA
FY 1971-78

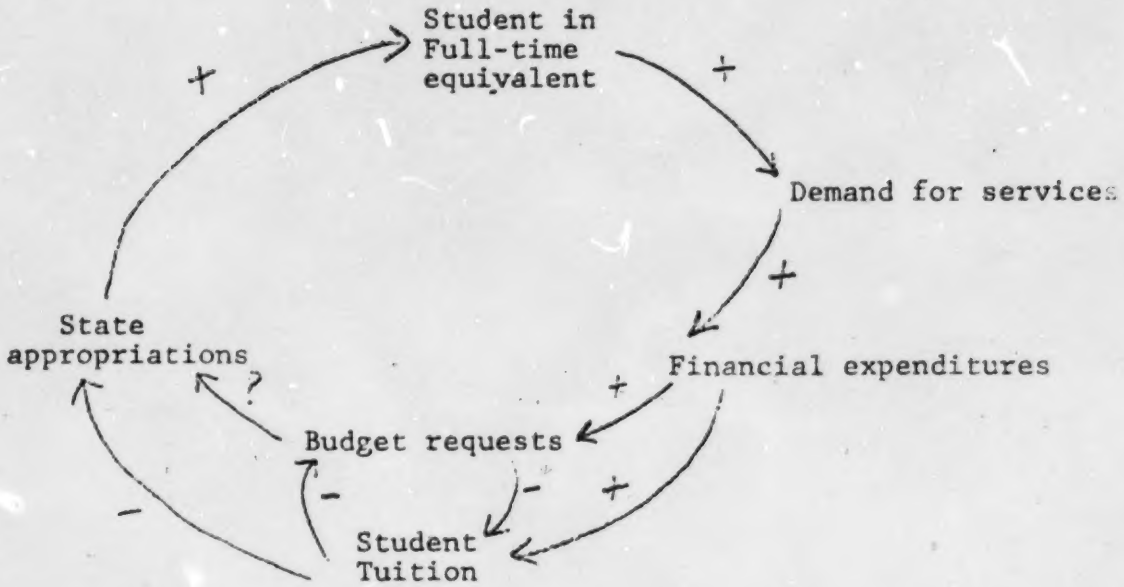
FY	Arizona State University				University of Arizona				Northern Ariz. University				Aggregate			
	R/SFTE		PLAR/SFTE		R/SFTE		PLAR/SFTE		R/SFTE		PLAR/SFTE		R/SFTE		PLAR/SFTE	
	$	%Chg	$	%Chg	$	%Chg	$	%Chg	$	%Chg	$	%Chg	$	%Chg	$	%Chg
71	1,451		1,451		1,734		1,734		1,474		1,474		1,576		1,576	
72	1,570	8.2	1,480	2.0	1,866	7.6	1,762	1.6	1,555	5.5	1,470	-0.3	1,695	7.6	1,600	1.5
73	1,710	8.9	1,544	4.3	2,100	12.5	1,895	7.5	1,768	13.7	1,580	7.5	1,885	11.1	1,699	6.2
74	1,956	14.4	1,648	6.7	2,343	11.6	1,971	4.0	2,025	14.5	1,677	6.1	2,131	13.1	1,790	5.4
75	2,073	6.0	1,612	-2.2	2,728	16.4	2,121	7.6	2,127	5.0	1,613	-3.8	2,346	10.0	1,818	1.6
76	2,111	1.8	1,533	-4.9	2,747	.7	1,996	-5.9	2,038	-4.2	1,450	-10.1	2,355	.4	1,707	-6.1
77	2,452	16.2	1,673	9.1	3,124	13.7	2,131	6.8	2,283	12.0	1,529	5.4	2,694	14.4	1,834	7.4
78	2,683	9.4	1,712	2.3	3,657	17.1	2,334	9.5	2,455	7.5	1,537	.5	3,026	12.3	1,927	5.1

TABLE 5
COMPARISON OF GROWTH RATES OF
PLAR AND PLAR/SFTE

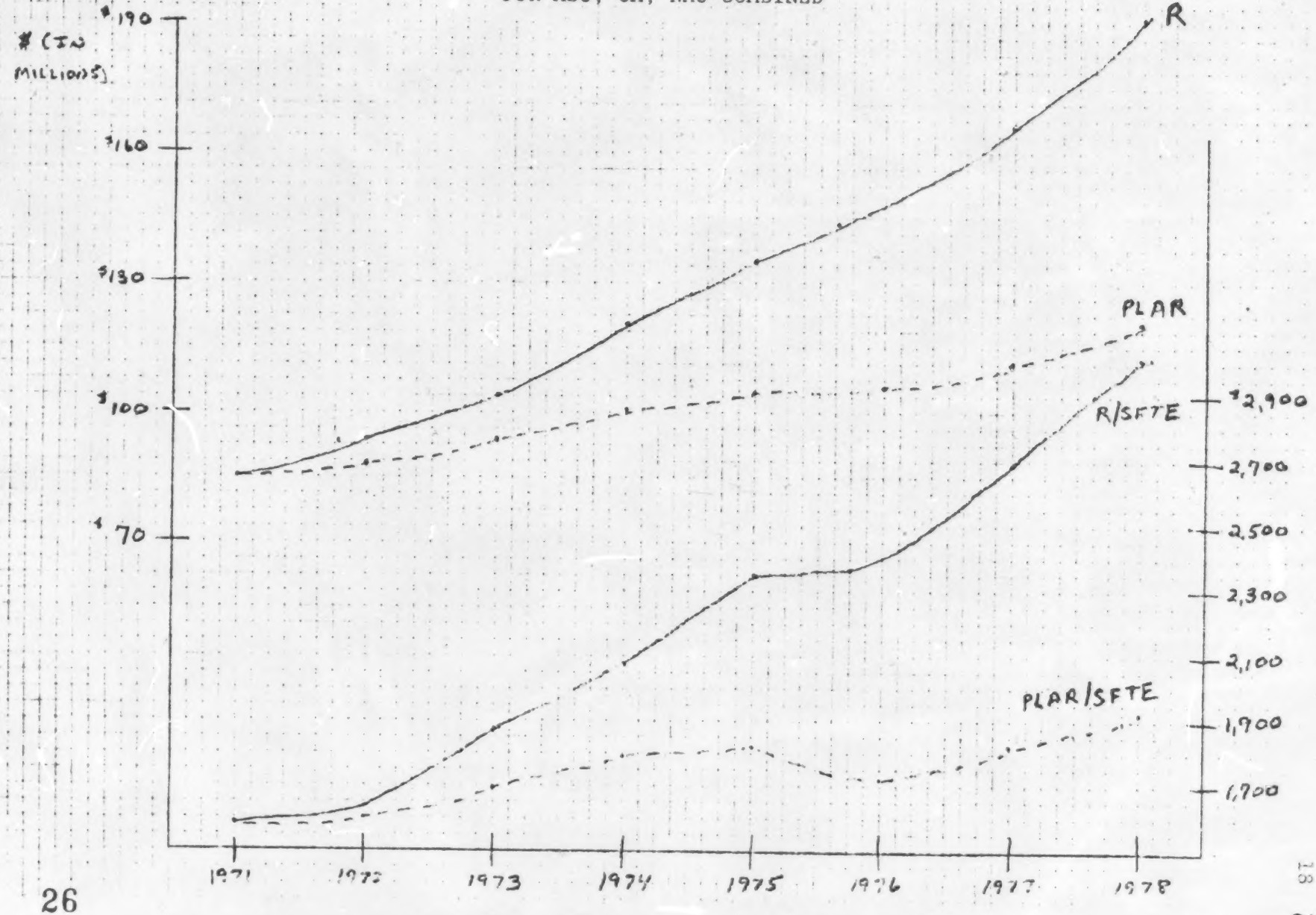
Fiscal Year	ASU		UA		NAU	
	PLAR	PLAR/SFTE	PLAR	PLAR/SFTE	PLAR	PLAR/S
1971-72	3.6%	2.0%	4.5%	1.6%	5.2%	-0.3
1972-73	5.2	4.3	5.7	7.5	4.1	7.5
1973-74	10.4	6.7	7.2	4.0	7.1	6.1
1974-75	4.2	-2.2	4.0	7.6	0.0	-3.8
1975-76	3.1	-4.9	.8	-5.9	-1.5	-10.1
1976-77	6.9	9.1	4.8	6.8	8.3	5.4
1977-78	5.0	2.3	9.2	9.5	6.9	.5

FIGURE 1

A UNIVERSITY RESOURCE FLOW MODEL



GRAPH OF R, PLAR, R/SFTE AND PLAR/SFTE
FOR ASU, UA, NAU COMBINED



INDEX

Working Papers in Accounting

AC 74-1	James R. Bright Michael J. Granof Charles H. Smith	"Technological Forecasting and Depreciation Estimates"
AC 74-2	R. G. Schroeder C. David Baron	"Attitudes of Selected CPA's Toward Proposed Extensions to the Auditor's Attest Function"
AC 74-3	C. David Baron	"Financial Reporting Practices of Voluntary Health and Welfare Organizations: 1964-1973"
AC 74-4	Patrick B. McKenzie	"Use of the Gauss-Jordon Method of Matrix Inversion to Explain the Simplex Method of Linear Programming."
AC 77-5	Andrew Haried	"Criteria For Revenue and Expense Recognition: Problems in Interpretation and Application"
AC 78-6	Patrick B. McKenzie	"Reciprocal Service Department Cost Allocation Models"
AC 78-7	Joseph W. Wilkinson	"Current Developments in Financial Planning Models and Planning Data Bases"
AC 79-8	James L. Chan Gerald E. Snyder	"Evaluating the Economic Viability of Universities by Using Price-Level-Adjusted Financial Data"